Process, service computer, switching centre,
terminals and program modules for handling incoming
telephone calls during an online data-network session
blocking a subscriber line

The present invention relates to a process according to the
preamble to Claim 1 and also to a service computer
according to the preamble to Claim 10 for said process, a
switching centre according to the preamble to Claim 11 for
5   said process, a terminal according to the preamble to Claim
12 for said process, a terminal according to the preamble
to Claim 13 for said process, an access-data-sending
program module according to the preamble to Claim 14 and a
program module according to the preamble to Claim 15 for
10 said process.

If a typical end user sets up an online connection to a
data network, in particular to the Internet, with his
terminal, customarily with a personal computer, to this end
15 he generally makes use of the services of a public
telephone network, also designated as a PSTN (Public
Switched Telephone Network). The subscriber then links his
terminal, e.g. via a modem or an ISDN adapter (ISDN =
Integrated Services Digital Network), to the subscriber
20 line leading to his home and dials at the terminal the
number of an access device leading to the Internet. The
public telephone network then establishes the connection
between the terminal and the access device, so that the
subscriber is "online" with his terminal. However, whilst
25 the online session is being maintained via the subscriber
line the subscriber can only be reached via the Internet,
for example via e-mails. A further connection of third
parties to the subscriber, e.g. via telephone, is not
possible. A possible communication partner who calls the
30 subscriber then obtains an "engaged" signal.

Of course, before he sets up the online connection the
subscriber may possibly set up a call-forwarding service

for his subscriber line to an alternative destination for
the case where he is engaged ("call forwarding busy"), so
that any incoming call during [an] online session is
forwarded to an alternative communication partner who then
5   accepts the call in place of the subscriber who is actually
wanted. Or, as a further alternative, the call can also be
forwarded to automatic answering equipment ("voicemail
box") which is present in the public telephone network, and
the communication request of the caller is satisfied at
10   least partially. However, in both cases the subscriber
receives no information of any kind during his online
session that a call for him has been accepted. Moreover,
the subscriber has to set up the call-forwarding service
laboriously prior to each online session and subsequently
15   has to deactivate it again in just as laborious a manner if
he does not wish to forego the acceptance of calls
permanently, and in appropriate circumstances he also has
to interrogate the voicemail. In addition, with the
solution with call-forwarding service that has been
20   presented, major resources of the telecommunications
network are occupied, because an incoming call does not
only have to be put through to the local switching centre
to which the subscriber line pertaining to the subscriber
who is surfing the Internet is linked but also has to be
25   put through from this local switching centre to the
automatic answering equipment.

The object of the invention is therefore to handle incoming
telephone calls for a subscriber line of a
30   telecommunications network comfortably and efficiently
while the subscriber line is blocked by an online data-
network session of a terminal.

This object is achieved by a process according to the
35   technical teaching of Claim 1 and also by a service
computer according to the technical teaching of Claim 10, a

switching centre according to the technical teaching of
Claim 11, a terminal according to the technical teaching of
Claim 12, a terminal according to the technical teaching of
Claim 13, an access-data-sending program module according
5   to the technical teaching of Claim 14 and a program module
according to the technical teaching of Claim 15. Further
advantageous configurations of the invention can be
inferred from the dependent claims and the specification.

10   The idea underlying the invention is that, firstly, an
online connection to an access device of an online data
network, in particular of the Internet, is set up in known
manner via a subscriber line of a public telecommunications
network by a subscriber with a terminal, for example with a
15   personal computer, and subsequently the access device sends
off to the terminal the access data required for the actual
Internet access. In accordance with the invention, the
terminal then signals these access data to a service
computer of the telecommunications network, which with the
20   aid of these access data can provide services for the
purpose of handling incoming calls for the subscriber line
which is now occupied by the online connection. If a call
for the occupied subscriber line is then received, the
switching centre of the telecommunications network, which
25   by reason of the occupancy cannot put the call through,
informs the service computer that a call is waiting. To
this end, with a view to triggering the message, a so-
called trigger point in the switching centre in the call-
control system thereof, for example, is set permanently or
30   each time the online connection is set up. The switching
centre may be, for example, a local switching centre which
operates the subscriber line or may be any other switching
centre of the telecommunications network which recognises
that the call for the subscriber line cannot be put
35   through. The service computer then supplies a
predetermined service for handling the call that cannot be

put through. In this case it proves to be particularly
advantageous that the call from the switching centre does
not have to be routed onward by the switching centre to a
particular destination from the outset but is firstly held
5   by the switching centre in queueing condition. As a
result, on the one hand the call does not constitute a
burden on any further resources whatsoever in the
telecommunications network, and on the other hand the call
can be subjected to further processing in one of the
10   following variants.

The service computer may, for example, send a message to
the terminal via the online data network to the effect that
a call for the subscriber is waiting. The subscriber can
15   then, for example, break off his online session and accept
the waiting call. In this process no further network
resources whatsoever are required for a possible forwarding
of the waiting call.

20   The service computer may also instruct the switching centre
to forward the call to a predetermined alternative
destination, for example to a voicemail box within the
telecommunications network or to a mobile-telephone
terminal owned by the subscriber. In particular, if the
25   call is not at first held in readiness by the local
switching centre operating the occupied subscriber line but
by a switching centre situated upstream of this switching
centre, valuable resources of the telecommunications
network are conserved in the course of subsequent
30   forwarding of the call by the switching centre, since the
call simply does not at first get as far as the local
switching centre.

In another variant the service computer can instruct the
35   switching centre to forward the call into the online data
network as a so-called Voice-over-Internet-Protocol call

(VoIP) via a so-called gateway. Said online data network
then routes the VoIP call back again to the terminal which
then accepts the VoIP call within the context of the online
session running there. The subscriber can consequently be
5   reached without elaborate call forwarding and without his
online session being interrupted.

Although the variants of the call-handling described above
can be set permanently in the service computer in
10   accordance with the wishes of the subscriber, it is also
possible for a selection menu to be sent by the service
computer to the terminal pertaining to the subscriber via
the online data network, from which the subscriber then
selects one of the aforementioned variants. The terminal
15   then informs the service computer which variant the
subscriber has selected, in order that said service
computer can supply the desired service. Accordingly, a
whole package of services is offered to the subscriber in a
convenient and comfortable manner.
20

In this way it may in fact be predetermined that whenever a
call for the subscriber line which is occupied - by the
online connection or by some other call connection - comes
in at the switching centre the switching centre queries the
25   service computer about a service for handling the incoming
call. In another variant of the invention, however, the
service computer notes whether the subscriber line is
blocked by an online connection, for example after
receiving the current access data of the terminal, and
30   instructs the switching centre to signal incoming calls to
the service computer during the current online connection.
Then the service computer is burdened only by querying of
the switching centre when the subscriber line is blocked by
an online session and not when the subscriber line is
35   occupied by some other call connection.

Furthermore, the switching centre can signal to the service
computer when the terminal has terminated an online
session, so that the service computer can erase the access
data that are now no longer current and no longer used, for
5   the purpose of saving memory space.

The invention and its advantages will be presented in the
following on the basis of embodiments with the aid of the
drawings.
10

Figure 1   shows an arrangement for executing the process
  according to the invention, with an embodiment of a
  terminal TERA according to the invention, an embodiment of
  a switching centre SW1 according to the invention and also
15   an embodiment of a service computer SCP according to the
  invention.
Figure 2   shows a flow chart of the process according to
  the invention.
Figure 3   shows substantially the arrangement from Figure
20   1, the components known from Figure 1 being, in part,
  connected to one another in a different way.
Figure 4   likewise shows substantially the arrangement from
  Figure 1, but instead of the service computer SCP an
  embodiment of a service computer GPTM according to the
25   invention.

Figures 1, 2 and 3 show embodiments that are based on a so-
called Intelligent Network; Figure 4 shows an embodiment
that, for example, may be based on the Internet or on an
30   Intranet.

Represented in Figure 1 is an exemplary arrangement with
which the invention can be executed. Figure 1 shows a
telecommunications network PSTN, an online data network INT
35   and also terminals of a subscriber SUBA, indicated in each
case by a dotted box. The subscriber SUBA has at his

disposal a terminal TERA according to the invention as well
as two further terminals TELA1 and TELA2 which may be, for
example, fixed-network telephones or mobile telephones.
The terminal TERA according to the invention is connected

5   via a subscriber line VA11 to a subscriber connecting jack
TAE. The terminal TELA1 is connected to the subscriber
connecting jack TAE via an alternative connecting line
VA21. The terminal TERA is, for example, a personal
computer. However, the terminal TERA may also be a mobile-

10 telephone terminal or a fixed-network telephone with which,
in each case, access to the Internet is possible. The
terminal TERA exhibits a connection means TRTER which may
be, for example, a modem or an ISDN adapter. With the
connection means TRTER the terminal TERA can set up a

15 connection to the online data network INT via the
telecommunications network PSTN. Moreover, the terminal
TERA exhibits a control means CPUTR and also a memory means
MEMTR. The control means CPUTR is, for example, a
processor with which program code can be executed that is

20 stored in the memory means MEMTR. The memory means MEMTR
is, for example, a fixed disc or RAM chips. Moreover, the
terminal TERA exhibits a display means DISA and also an
input means KEYA. The display means DISA is, for example,
a computer monitor or an LCD display (Liquid Crystal

25 Display). The input means KEYA may be a keyboard or a
mouse. Moreover, the terminal TERA exhibits a loudspeaker
SPA and also a microphone MICA, with which voice output and
voice input, respectively, are possible.

30 Of the telecommunications network PSTN, which, for example,
may be an ISDN telecommunications network (ISDN =
Integrated Services Digital Network) or a mobile-telephone
network, a switching centre SW1 according to the invention,
a switching centre SW2 and also a service computer SCP

35 according to the invention are shown as being
representative of further devices which are not shown in

Figure 1. The switching centres SW1 and SW2 are connected
to one another via a connecting line V12. The connecting
line V12 may be a channel group between the two switching
centres. But it is also possible for the connection V12 to
5   be routed via further switching centres which are not
represented in Figure 1. The switching centre SW1 and the
service computer SCP are connected to one another via a
connection VSC. The connection VSC is a connection which
is preferably routed via a signalling channel or via a
10 signalling network. Such a signalling network is, for
example, the Central Signalling System No. 7. However, the
connection VSC may also be routed via a so-called VPN
(Virtual Private Network) which may be a private logical
network based on the telecommunications network PSTN or on
15 the Internet INT. Of the switching centre SW1, several
essential components are shown in exemplary manner, namely
a connection means TRSW and also a control means CPUSW and
a memory means MEMSW. With the connection means TRSW the
switching centre SW1 may set up, on the one hand, data
20 links and voice links to subscribers or to other switching
centres. On the other hand, the connection means TRSW may
also set up signalling connections such as, for example,
the connection VSC to the service computer SCP. The
control means CPUSW is a processor or a group of processors
25 which can execute commands that are stored in the memory
means MEMSW. The control means CPUSW controls the
functions of the switching centre SW1 and in the process
exerts an influence on, for example, the functions of the
connection means TRSW. The connection means TRSW, the
30 control means CPUSW and the memory means MEMSW are mutually
connected by connections which are not shown in Figure 1.
Moreover, the switching centre SW1 may exhibit further
subassemblies, for example a coupling network or an
interface to a Network Management System. The switching
35 centre SW2 may be equipped internally in the same way as
the switching centre SW1. The switching centre SW2 may,

however, also be a conventional, known switching centre.

The service computer SCP exhibits a connection means TRSC
and also a control means CPUSC and memory means MEMSC. The
5 service computer SCP may be a server that is operated by a
UNIX operating system or by a Windows NT operating system.
  The control means CPUSC is a processor or a cluster of
processors which executes the commands of the operating
system that is stored in the memory MEMSC. Moreover, in
10 the memory means MEMSC, which, for example, comprises a
fixed disc or RAM chips, program-code sequences may be
stored which are executed by the control means CPUSC. The
control means CPUSC also influences the functions of the
connection means TRSC with which, for example, the
15 aforementioned connection VSC can be set up. The service
computer SCP also exhibits further subassemblies which are
not represented in Figure 1, for example a monitor, a
keyboard and a mouse. The service computer SCP may also
operate further switching centres besides the switching
20 centre SW1.

The service computer SCP is preferably – but not
necessarily – a service computer of an Intelligent Network,
a so-called Service Control Point (SCP). The switching
25 centre SW1 is then a service switching centre which is also
designated as a Service Switching Point. The
telecommunications network PSTN acting as an Intelligent
Network may in this case also comprise further components,
for example a so-called Service Management Point (SMP),
30 with which the services of the Intelligent Network are
controlled, as well as a so-called Service Creation
Environment (SCE), with which services for an Intelligent
Network can be generated. The service computer SCP
supplies services for the switching centre SW1 and also for
35 further switching centres which are not represented but
which are equipped similarly. Such a service is, for

example, the known Freecall service (call numbers beginning with "0800"). Although the switching centre SW1 and the service computer SCP can meet the requirements of an Intelligent Network, according to the invention they may

5 also interact in a free manner defined by the proprietor. The connection VSC is then routed, for example, via a Local Area Network (LAN). Such a proprietary interaction can also be defined if the switching centre SW1 and the service computer SCP are combined to form a single device, a so-

10 called Service Switching and Control Point (SSCP). The memory means MEMSW then additionally performs the functions of the memory means MEMSC, the control means CPUSW performs the functions of the control means CPUSC, and the connection means TRSW performs the functions of the

15 connection means TRSC.

Of the online data network INT, merely the access device POP and also a gateway VOGW are represented. The online data network INT is preferably the Internet. The further

20 infrastructure of the data network INT – for example servers, routers, gateways and such like – are not represented in Figure 1, for reasons of simplicity.

A typical process sequence will now be presented in the

25 following on the basis of the arrangement from Figure 1 with the aid of the flow chart from Figure 2.

In a step S21 the subscriber SUBA sets up a connection to the access device POP of the online data network INT with

30 his terminal TERA. To this end, the subscriber SUBA enters on the input means KEYA the subscriber number of the access device POP. Via the connecting line VA11 and the subscriber line VA1 the terminal TERA thereupon sets up a connection to the switching centre SW1. With the aid of

35 the subscriber number of the access device POP the switching centre SW1 then completes the desired connection

of the subscriber SUBA, and to this end sets up the further connection VPOP1 to the access device POP. The access device POP thereupon sends current access data to the terminal TERA in a step S22. The access data comprise, in particular, an address via which the subscriber terminal TERA can be reached from the online data network INT. If the online data network INT is the Internet, the Dynamic Host Configuration Protocol (DHCP), for example, is employed as such a process. In the DHCP process an Internet address is allocated dynamically which is valid only for the current online session. If the Internet address is not allocated exclusively to the terminal TERA but can also be used for further terminals, the access device POP also sends a further identifier, a so-called port-number, with which the terminal TERA can be uniquely addressed from the online data network INT. With the aid of the access data that are now available, the devices of the online data network INT can be reached via the terminal TERA. To this end, a so-called browser, for example a WAP browser (WAP = Wireless Application Protocol) or a Netscape Navigator, is executed by the control means CPUTR, with which data received from the Internet can be evaluated and displayed.

However, by virtue of the online connection to the online data network INT the subscriber line VA1 pertaining to the subscriber SUBA is blocked. In order that a caller who would like to reach the subscriber SUBA via the subscriber line VA1 does not hear only an engaged signal, the terminal TERA sends the current access data to the service computer SCP in a step S23. To this end, the control means CPUTR executes a program that is stored in the memory MEMTR. This program, which may be, for example, a so-called Java applet, then sends off a message with the access data and also with the subscriber number of the subscriber line VA1, addressed to the service computer SCP. This message is

firstly sent to the switching centre SW1 via the subscriber
line VA1 and then to the access device POP via the
connection VPOP1. On the basis of the address of the
service computer SCP that is contained in the message, for
5   example by way of the return address which is required
conventionally, the message can then be sent either
directly from the access device POP to the service computer
SCP on the connection VSCIP or indirectly over the online
data network INT via a connection which is not represented
10   in Figure 1. In addition to the access data for the online
data network INT, the message may also contain a password
which protects against improper use of the service
according to the invention. The service computer SCP now
stores the access data and the subscriber number from the
15   message in its memory means MEMSC and is therefore notified
which current access data the terminal TERA can be reached
under via the online data network INT. In the possible
case where the access device POP carries out a translation
of the address of the terminal TERA, the translated address
20   is entered into the message by the access device POP, so
that the service computer SCP receives those access data
under which the terminal TERA can be addressed.

If the subscriber line VA1 is an ISDN subscriber line or a
25   radio link to a mobile-telephone network, in one variant of
the invention the terminal TERA can also send the access
data to the switching centre SW1 via a signalling channel,
a so-called D-channel or a service channel. The switching
centre SW1 then routes these access data onward to the
30   service computer SCP in the form of a service message on
the connection VSC.

If another subscriber now wishes to reach the subscriber
SUBA, for example by making a call to the subscriber SUBA
35   via the terminal TELB, the subscriber firstly enters the
subscriber number of the subscriber line VA1 at the

terminal TELB, so that the terminal TELB can set up a connection VB1 to the switching centre SW2. The latter then establishes the connection V12 to the switching centre SW1. However, the switching centre SW1 cannot put the call 5 through to the subscriber connecting device TAE, since the terminal TERA is blocking the subscriber line VA1 with its online session. Therefore in a step S24 the switching centre SW1 signals to the service computer SCP the fact that a call for the subscriber line VA1 is waiting.

10

The service computer SCP thereupon supplies a predetermined service in a step S25 for the purpose of processing the call that has come in. In this process the service computer SCP sends, for example with the aid of the access 15 data of the terminal TERA that are saved in the memory MEMSC, a message about the connection VSCIP, the access device POP, the connection VPOP1 and the connection VA1 to the terminal TERA, in which attention is drawn to the fact that a call has come in. This message is then displayed by 20 the terminal TERA on the display means DISA. But the message may also be, for example, Java code which can be executed by the browser that is running on the terminal TERA. The subscriber SUBA can then, for example, break off his online connection to the online data network INT, so 25 that the switching centre SW1 can put through the call that has come in to the subscriber line VA1. The subscriber SUBA can accept the call, for example via the terminal TELA1 and the connecting line VA21.

30 However, it is also possible for the service computer SCP to send an instruction to the switching centre SW1 via the connection VSC, in which it instructs the switching centre SW1 to put the incoming call through to the terminal TELA2 pertaining to the subscriber SUBA via the subscriber line 35 VA2. The switching centre SW1 then routes the call onward to the terminal TELA2. The subscriber SUBA can

consequently continue to remain online and nevertheless
accept a call via his second terminal TELA2. It may, for
example, be the case that the subscriber line VA1 is routed
via a line-conducted network, whereas the subscriber line
5   VA2 is routed via a mobile-telephone network.

In particular, if the subscriber SUBA does not have a
second terminal TELA2 at his disposal it is very
advantageous if the service computer SCP instructs the
10   switching centre SW1 to route the call that has come in
onward to the terminal TERA via the online data network
INT. The switching centre SW1 then firstly establishes a
connection VGW1 to the gateway VOGW. The gateway VOGW can
convert voice messages or voice signals coming from the
15   telecommunications network PSTN into conventional digital
data messages on the online data network INT. Conversely,
the gateway VOGW converts data messages originating from
the online data network into voice signals or voice
messages. The gateway VOGW establishes a connection VC to
20   the access device POP via the online data network INT. The
connection VC may be routed via various devices which are
not represented in Figure 1, for example servers and
routers pertaining to the online data network INT. The
access device POP then sends voice-data messages received
25   from the gateway VOGW to the terminal TERA via the
connections VPOP1 and VA1. The terminal TERA then outputs
these messages via its loudspeaker SPA. In the reverse
direction the terminal TERA receives speech via the
microphone MICA, converts this speech into data, and sends
30   these data to the access device POP. The access device POP
relays the voice messages to the gateway VOGW, which
generates speech or voice messages therefrom. These voice
messages then reach the terminal TELB via the connection
VGW1, via the switching centre SW1, via the connection V12
35   and via the switching centre SW2. In this way the
subscriber SUBA can, on the one hand, exchange data with

the online data network INT but can, on the other hand, be
reached at any time for voice communication.

As a reaction to a call that is waiting in the switching
5   centre SW1 the service computer SCP can also instruct the
switching centre SW1 to break off or to interrupt the
online data-network session blocking the subscriber line
VA1 and to signal the incoming call on the subscriber line
VA1. In the case of an interruption, the switching centre
10   SW1 firstly puts the connection VPOP1 in a queueing
condition. In the case of a disconnection, this step may
be dispensed with. The switching centre SW1 then sends a
call signal on the subscriber line VA1. The subscriber
SUBA1 can then accept the incoming call via his terminal
15   TELA1 or even via the terminal TERA. If the online session
should only have been interrupted by the new call which has
now been accepted, the switching centre SW1 re-establishes
the originally existing online connection VA11, VA1, VPOP1
after termination of the interim call connection.
20

In the case of a call that is waiting in the switching
centre SW1 the service computer SCP can also instruct the
terminal TERA to break off or to interrupt the online data-
network session blocking the subscriber line VA1. When the
25   terminal has executed this instruction, the switching
centre SW1 signals the incoming call on the subscriber line
VA1 and puts the call through to the subscriber line VA1
when the call is accepted by the terminal TERA or by the
terminal TELA1. If an interruption of the online data-
30   network session has been configured, after termination of
the call that has been put through in the interim the
terminal TERA can resume the online data-network session by
setting up the online connection VA11, VA1, VPOP1 again.

35   Which of the services that have already been described is
supplied by the service computer SCP can be defined by an

appropriate preconfiguration in the memory MEMSC. Such a
configuration can, for example, be configured remotely by a
Network Management System or can be set from the terminal
TERA via an HTML interface (HTML = HyperText Markup
5   Language) of the service computer SCP, which can be reached
from the terminal TERA via the online data network INT, and
the HTML data of which can be displayed by means of a
browser in the terminal TERA.

10   However, in a particularly comfortable variant of the
invention the service computer SCP firstly sends a
selection menu to the terminal when a call is waiting for
the blocked subscriber line VA1, by means of which
selection menu a selection of possible follow-up services
15   is offered with a view to processing the incoming call.
The service computer SCP can send this selection menu, for
example in the form of a message, via the connection VSCIP
to the access device POP and then further via the
connection VPOP1, the switching centre SW1, the subscriber
20   line VA1 and the connecting line VA11 to the terminal TERA.
The terminal TERA then displays the selection options
contained in the message with the aid of a program that is
stored in the memory means MEMTR and executed by the
control means CPUTR. Instead of a simple message with
25   selection options, the service computer SCP can also send a
program that is capable of being evaluated by the control
means CPUTR to the terminal TERA. The program may, for
example, be written in the page description language HTML
and/or in the Java programming language. The terminal TERA
30   displays the selection options in the form of a selection
menu on the display device DISA with the aid of a browser
or a Java interpreter. If the subscriber SUBA then makes a
selection by entering an input command via the input means
KEYA, the terminal TERA accepts this input in a step S26.
35   In a step S27 the terminal TERA then sends the selection
that has been made to the service computer SCP on the

connecting path VA11, VA1, VPOP1, VSCIP. Said service
computer can subsequently supply the service that is
desired by the subscriber SUBA. If the subscriber SUBA
[sic] has, for example, wished for the waiting call to be
5   routed onward to a telephone-answering machine pertaining
to the telecommunications network PSTN, the service
computer SCP sends an instruction to the switching centre
SW1 via the connection VSC to route the waiting call onward
to a telephone-answering module which is not represented in
10   Figure 1.

The arrangement known from Figure 1 is substantially
represented in Figure 3. However, in contrast to Figure 1,
in Figure 3 the terminal TERA pertaining to the subscriber
15   SUBA is linked to the switching centre SW2 via a subscriber
line VA3. For reasons of simplification, the terminal
TELA2 of the associated subscriber line VA2 pertaining to
the subscriber SUBA is also dispensed with. Moreover, the
terminal TELB is now linked via a subscriber line VB3 no
20   longer to the switching centre SW2 but to the switching
centre SW1. Instead of the connection VPOP1 between
switching centre SW1 and access device POP, Figure 3 shows
a connection VPOP3 between the switching centre SW2 and the
access device POP. Furthermore, the gateway VOGW is no
25   longer connected to the switching centre SW1 but rather to
the switching centre SW2 via a connection VGW3. On the
basis of Figure 3 it will now be demonstrated that a call
does not have to be put straight through to the local
switching centre which operates the subscriber line of the
30   subscriber SUBA while said subscriber is blocking his
subscriber line by means of an online session.

In the manner already presented, the subscriber SUBA
establishes a connection via his subscriber line VA3 and
35   the connection VPOP3 to the access device POP of the online
data network INT. As a result, the subscriber line VA3 is

blocked for further calls. If the call number of the
subscriber connection VA3 is now entered at the terminal
TELB, firstly a connection VB3 to the switching centre SW1
is established. In a first variant the switching centre
5   SW1 then sets up the further connection V12 to the
switching centre SW2. The switching centre SW2 thereupon
signals to the switching centre SW1 the fact that the
subscriber line VA3 is occupied. Thereupon the switching
centre SW1 can clear down the connection V12 and query the
10   service computer SCP about further instructions for
handling the waiting call. In a second variant the
switching centre SW1 can also merely execute a query – via
a signalling network which is not represented in Figure 3 –
at the switching centre SW2 as to whether it is possible
15   for the desired call to be put through to the subscriber
SUBA at all. By means of a signalling reply message the
switching centre SW2 then communicates to the switching
centre SW1 the fact that the subscriber line VA3 is
blocked. In this case not even a call connection between
20   switching centre SW1 and the switching centre SW2 is
established. In a third variant the switching centre SW1
can ask the service computer SCP directly whether a call to
the subscriber SUBA is to be handled in a particular
manner. In each of the three cases the service computer
25   SCP can then supply one of the services already described
above with the aid of the current access data of the
terminal TERA. Such a service may, for example, consist in
the service computer SCP sending an instruction to the
switching centre SW1 to establish a voice link via the
30   connection V12, the switching centre SW2, the connection
VGW3, the gateway VOGW, the connection VC, the access
device POP, the connection VPOP3, the subscriber line VA3
and the connecting line VA11 as far as the terminal TERA.
On the basis of the last-mentioned examples it becomes very
35   clear that by virtue of the invention the resources of the
telecommunications network PSTN are burdened very little

if, on account of an online session, a call cannot be put
through to a subscriber line. In the example from Figure 3
the switching centre SW1 is a local switching centre. The
switching centre SW1 may, however, also be a transit

5 exchange which switches calls from another
telecommunications network for the telecommunications
network PSTN, which is not represented in Figure 3.

If the telecommunications network PSTN exhibits further

10 service computers that are similar to the service computer
SCP, it is particularly advantageous if the access data of
the subscriber SUBA and also of further subscribers who are
not represented in the Figures are collected in a central
database which is likewise not represented in the Figures.

15 Such a database may, for example, be a so-called Service
Management Point in which the access data of the respective
subscribers are saved. The Service Management Point then
provides the service computers - inter alia also the
service computer SCP - with current access data.

20

The arrangement known from Figure 1 is substantially
represented in Figure 4. A variant of the solution without
an Intelligent Network will be described in the following
on the basis of Figure 4. Instead of the service computer

25 SCP, in Figure 4 a service computer GPTM is represented
which via a connection means IGP can set up a connection
VGPGW to a gateway GW of the online data network INT. The
gateway GW is a computer that enables the service computer
GPTM to have access to the online data network INT. The

30 so-called Transmission Control Protocol / Internet Protocol
(TCP/IP) is preferably used on the connection VGPGW. A so-
called firewall which controls the access to the service
computer GPTM may also be interpolated into the connection
VGPGW. Although the service computer GPTM could, like the

35 service computer SCP, also be a Service Control Point of an
Intelligent Network, in the present embodiment shown in

Figure 4 it is an independent server which, regarded
logically, is not a direct constituent of the
telecommunications network PSTN. Therefore the dotted box
indicating the telecommunications network PSTN does not
5   comprise the service computer GPTM. In principle, the
service computer GPTM may also perform the services already
described within the context of the service computer SCP.

The service computer GPTM may be a computer that is
10   operated by a UNIX operating system or by a Windows NT
operating system. The control means CPUGP is a processor
or a cluster of processors which executes the commands of
the operating system that is stored in the memory MEMGP.
Moreover, in the memory means MEMGP, which, for example,
15   comprises a fixed disc or RAM chips, program-code sequences
may be stored which are executed by the control means
CPUGP. The control means CPUGP also influences the
functions of a connection means TRGP with which a
connection VGP to a connection means LPTM of the switching
20   centre SW1 can be set up. The service computer GPTM also
exhibits further subassemblies which are not represented in
Figure 1, for example a monitor, a keyboard and a mouse.
The service computer GPTM may also operate further
switching centres besides the switching centre SW1.

25

The connection VGP may be routed via a channel of a
signalling network, for example the Central Signalling
System No. 7, but in the embodiment shown in Figure 4 it is
a connection which is routed via the Internet, the online
30   data network INT or via a separate Local Area Network (LAN)
and on which transmission takes place with the aid of the
Transmission Control Protocol / Internet Protocol (TCP/IP).
 The connection VGP may also be routed via a Virtual
Private Network (VPN). The connection means LPTM and TRGP
35   are each interface modules which are designed for this
purpose.

As already presented within the context of steps S26 and
S27, the connection means IGP offers the subscriber SUBA a
configuration interface on his terminal TERA, via which the
5   subscriber SUBA can select possible follow-up services for
the purpose of processing a call that comes in during an
online session. The subscriber can, on the one hand,
select or parameterize follow-up services permanently via
the connection means IGP. On the other hand, the
10 subscriber may log on via the connection means IGP also at
the start of an online session and activate one of the
services according to the invention.

With a view to setting up an online session, firstly a
15 connection from the terminal TERA to the access device POP
is set up in a manner already described, via the connecting
line VA11, the subscriber line VA1, the switching centre
SW1 and the connection VPOP1, and hence the subscriber line
VA1 is blocked. The terminal TERA then addresses the
20 connection means IGP of the service computer GPTM, for
example by a program module that is saved in the memory
means MEMTR and executed by the control means CPUTR sending
the (Internet) address of the service computer GPTM to the
access device POP. Thereupon a connection VIW between the
25 access device POP and the gateway GW is set up which then
sets up the connection VGPGW. For example, by input of an
operator identifier (user ID) and a password at the
terminal TERA the subscriber SUBA identifies himself as
being authorized for access to the service computer GPTM
30 and also to data that are stored for him in the memory
means MEMGP with a view to supplying telecommunications
services. The terminal TERA sends operator identifer and
password to the service computer GPTM. Furthermore, the
terminal TERA also sends current access data obtained from
35 the access device POP to the service computer GPTM. On the
basis of the receipt of the access data or also on the

basis of a separate item of information sent from the
terminal TERA, the service computer GPTM ascertains that
the terminal TERA is currently maintaining an online
session blocking the subscriber line VA1 and that the
5   subscriber SUBA is ordering a service for handling incoming
calls during the online session. The service computer GPTM
stores the access data and the activation of the service in
the memory means MEMGP.

10 The service computer GPTM then sends an instruction to the
switching centre SW1 to signal to the service computer GPTM
the fact that an incoming call destined for the subscriber
line VA1 is waiting, so long as the terminal TERA is
maintaining the connection to the online data network INT
15 blocking the subscriber line VA1. In response to the
instruction the switching centre SW1 sets an appropriate
status bit in the memory means MEMSW. The status bit can,
for example, be saved within the context of a so-called
"call waiting" service which is supplied by the switching
20 centre SW1 as an ISDN service and which is defined by the
ITU (International Telecommunication Union). The switching
centre SW1 acknowledges the acceptance of the instruction
with an acknowledgement signal to the service computer
GPTM. The signal is routed by the service computer GPTM to
25 the terminal TERA via the connection VGPGW-VIW-VPOP1-VA1-
VA11, so that the subscriber SUBA has the successful
activation of the service for handling incoming calls
during the online session displayed by the display means
DISA, for example. If an error occurs in the course of one
30 of the aforementioned steps, for example if an incorrect
password is specified, the service computer GPTM sends to
the terminal TERA a negative acknowledgement signal and
breaks off the process for activation of the service by the
subscriber SUBA. The switching centre SW1 also negatively
35 [...] to the service computer GPTM in the case of an error
and breaks off the process for activation of the service.

If, after activation of the service, a call for the
terminal TERA comes in at the switching centre SW1,
originating from the terminal TELB for example, the
5   switching centre SW1 checks whether the status bit has been
set and, in the affirmative case, sends a message to the
service computer GPTM to the effect that a call for the
blocked subscriber line VA1 is waiting. The message
contains the subscriber number of the subscriber line or
10 another identification digit assigned to the subscriber
line, as well as the subscriber number of the terminal
TELB, if available. After a possible check in the memory
means MEMGP, which is carried out in addition, as to
whether the service for the subscriber SUBA has been
15 activated, the service computer GPTM thereupon supplies the
selected service and in the process sends a message to the
terminal TERA, for example via the online data network INT,
to the effect that a call is waiting in the switching
centre SW1.

20

If the online session of the terminal TERA is terminated
and in the process the connection between terminal TERA and
access device POP is cleared down, the switching centre SW1
sends a message about the termination of the online session
25 to the service computer GPTM and resets the status bit in
the memory means MEMSW. The service computer GPTM also
resets its online status for the subscriber line VA1 and
releases the memory for the access data. By this means it
is ensured that the service for incoming calls is only
30 supplied by the service computer GPTM when, in each
instance, valid access data have been sent to the service
computer GPTM at the start of an online session, the
service has been correctly activated by the terminal TERA,
and the terminal TERA is also actually online.
35 Accordingly, in the case of the process associated with the
embodiment from Figure 4 the service computer GPTM never

operates with access data that are still present from an
earlier online session and that have possibly already
become invalid in the course of a new online session by
virtue of access data that have been re-allocated to the
5 terminal TERA by the access device POP.

The terminal TERA could also log off at the service
computer GPTM via the connection over the online data
network INT and deactivate the service for incoming calls.
10 However, a deactivation by the switching centre SW1
operates more reliably, since the terminal TERA may also
terminate the online session in surprising manner, for
example as a result of a so-called computer crash, that is
to say when a program error occurs in a program being
15 executed by the control means CPUTR. However, in the case
of less demanding requirements in terms of operational
reliability, simpler ways of proceeding are also possible,
in which, for example, the resetting of the status bit in
the switching centre SW1 when the online session is cleared
20 down is dispensed with or in which a clear-down of the
online session is signalled to the service computer GPTM
not by the switching centre SW1 but by the terminal TERA.

It is also possible for a switching centre which is not
25 connected to the service computer GPTM to be connected
upstream of the switching centre SW1, to which the terminal
TERA is linked. The services of the service computer and
also of the switching centre SW1 for handling incoming
calls during the subsequent online session can then, for
30 example, be activated in the following manner:

In the event of "call forwarding busy" a call-forwarding
service to a special call number which has been set up in
the switching centre SW1 is activated in the switching
35 centre connected upstream. Such an activation process is
known as such in the case of the "call forwarding busy"

service, a conventional ISDN service, and does not
therefore have to be elucidated. If during the subsequent
online session a call then comes in for the terminal TERA
in the switching centre connected upstream, said switching
5   centre routes the call onward to the special call number of
the switching centre SW1. The switching centre SW1 then
informs the service computer GPTM via the connection VGP,
in the manner described, of the fact that an incoming call
destined for the subscriber line VA1 is waiting. The
10   service computer GPTM thereupon sends, for example, a
message about the waiting call to the terminal TERA via the
online data network INT.